Coral Disease: What Corals Can Tell Us

Large numbers of corals are dying along Kauaʻi's north shore (from Mākua to ʻAnini and south as far as Ahukini Landing in Līhuʻe) due to a coral disease outbreak that has been characterize as an epidemic by the U.S. Geological Survey (USGS) in a 2012 report. Researchers from the USGS and University of Hawaiʻi Institute of Marine Biology are studying the outbreak and point to a mysterious cyanobacteria and fungi as the culprit. Cyanobacteria and fungi were detected on samples taken from the lesions or diseased areas of the coral (top photo on right). What triggered these cyanobacteria and fungi to cause a disease outbreak is unknown, however a large amount of sediment is present on the reefs afflicted by the disease.

Sediments from land and other pollutants are known to stress coral reefs (bottom photo). A link between this outbreak and the high levels of sediment is under investigation. Dr. Thierry Work, head of Infectious Disease for USGS, reported that this is the first known large scale outbreak of cyanobacteria/fungal coral disease in the state of Hawaii.

Coral disease was first observed in the wider Caribbean in the 1970s. It has since been documented across the Hawaiian archipelago and throughout the Indo Pacific including: American Samoa, Guam, and the US Remote Pacific Islands. The frequency and severity of coral diseases has increased globally in the last few decades. Many researchers point to warming sea surface temperatures and increasing human-related impacts as factors exacerbating coral disease. The consequences of coral disease on a reef can be catastrophic and result in a shift from a healthy coral dominated reef to an unhealthy algal dominated reef. For example in the Florida Keys, staghorn coral (*Acropora palmata*) was reduced up to 70%, with the dead corals being colonized by turf and fleshy algae. As corals are essential to the nearshore ecosystem, ensuring their long term health is critical.

Just think what would happen if coral reefs disappeared. Habitat would be severely degraded for the many marine creatures that depend on coral reefs. Our shorelines and coasts would also lose important protection from high wave energy.

The frequency and severity of diseases affecting coral reefs is truly alarming. To track outbreaks on a global scale, a Global Disease Database (http://coraldisease.org) was set up in 2000 by the National Oceanic and Atmospheric Administration and the United Nations Environment Program's World Conservation Monitoring Center. Based on studies from 1950 – 2013, there have been around 5,000 recorded outbreaks worldwide. A total of 16 genera of corals have been documented with one of at least 27 different coral diseases, with many other abnormalities still under investigation.

Pacific island national parks are not immune. Off of Hawaiʻi Volcanoes National Park, signs of disease have been observed. The PACN Benthic Marine monitoring program checks for signs of disease each year in War in the Pacific NHP, NP of American Samoa, Kaloko-Honokōhau NHP, and Kalaupapa NHP. Knowing about an outbreak is the first step in reducing its negative impacts.

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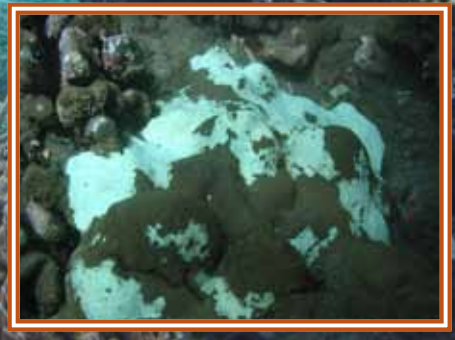
Corals with lesions

Corals with signs of disease near a national park



Sedimentation on the coral reef